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10/653,559	09/02/2003	Ronald F. Rykowski	40678-8002US	3217

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PERKINS COIE LLP
PATENT-SEA
P.O. BOX 1247
SEATTLE, WA 98111-1247

EXAMINER
AMADIZ, RODNEY

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2629	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/653,559	RYKOWSKI ET AL.
	Examiner	Art Unit	
	Rodney Amadiz	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>06 March 2007</u>.

2a) ☒ This action is **FINAL**.   2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-4,7-13,16-26,29 and 30</u> is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1-4,7-13,16-26,29 and 30</u> is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on <u>19 December 2003</u> is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a) ☐ All   b) ☐ Some *   c) ☐ None of:

   1. ☐ Certified copies of the priority documents have been received.

   2. ☐ Certified copies of the priority documents have been received in Application No. _____.

   3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>3/6/07</u>.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 30 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 31, recites the term "flat-fielded imaging photometer". This term is not found in the specification. Furthermore, this term is not defined in the specification. In the rejection below, the Examiner has interpreted a colorimeter to read on a flat-fielded imaging photometer.

Claim Rejections – 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 3, 4, 10, 12, 13, 16 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Greene et al. (U.S. 6,243,059) in view of Cottone et al. (U.S. Patent 6,677,958).

As to **Claim 1**, Greene et al. teaches a method of calibrating a visual display, the method comprising: (a) analyzing a visual display module, the module comprising an array of pixels and corresponding subpixels *(Col. 17, lines 12-39 and Fig. 8, Reference Number 53)*; (b) locating and registering multiple subpixels of the visual display module *(Col. 17, lines 25-29 and Col. 16, lines 10-13-note that storing data for each subpixel requires locating and registering the subpixels)*; (c) determining a chromaticity value and a luminance value for each registered subpixel *(Col. 16, lines 10-13)*. Greene et al. also teaches a target value *(Col. 16, lines 6-13)*. Greene et al. also teaches (f) calculating correction factors for each registered subpixel based on a difference between the measured chromaticity and luminance values and the target chromaticity and luminance values *(Col. 15, lines 40-43 and Col. 16, lines 32-42)*; and (g) sending the correction factors to the visual display module *(Col. 16, lines 35-43)*.

Greene et al. however, does not teach converting the chromaticity and luminance value for each registered subpixel value to measured tristimulus value in step (d) nor does Greene et al. teach converting a target chromaticity value and a target luminance value for a given color to target tristimulus values in step (e). Examiner cites Cottone et al. to teach that the conversion between the CIE chromaticity coordinates (x,y) and luminance value Y into the CIE tristimulus value (XYZ) is well known in the art *(Cottone—Col. 5, lines 9-15 and 50-52)*. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to convert the chromaticity and luminance values into tristimulus values as taught by Cottone et al. in the method for calibrating a visual display taught by Greene et al. so as to increase the precision of the

color/brightness values. Furthermore it is well known that color can be represented in different formats and any known method of defining color/brightness will perform equally well at helping calibrate a display.

As to **Claim 10**, Greene et al. teaches a method for calibrating a visual display, the method comprising: (a) analyzing a portion of a visual display module, the portion comprising an array of pixels and corresponding subpixels *(Col. 17, lines 12-39 and Fig. 8, Reference Number 53)*; (b) locating and registering multiple subpixels within the array *(Col. 17, lines 25-29 and Col. 16, lines 10-13-note that storing data for each subpixel requires locating and registering the subpixels)* (c) determining a chromaticity value and a luminance value for each registered subpixel within the array *(Col. 16, lines 10-13)*; (d) storing the chromaticity value and luminance value for each subpixel *(Col. 16, lines 10-13)*; (e) repeating steps (a) to (d) for each portion of the visual display module until all portions of the visual display module have been analyzed *(Col. 17, lines 12-39-note that the colorimeter does a scanning motion to collect the data)*. Greene et al. also teaches a target value *(Col. 16, lines 6-13)*. Greene et al. also teaches (h) calculating correction factors for each registered subpixel based on a difference between the measured chromaticity and luminance values and the target chromaticity and luminance values *(Col. 15, lines 40-43 and Col. 16, lines 32-42)*; (i) applying the correction factors to the stored chromaticity and luminance values for each subpixel *(Col. 16, lines 35-57)*; and (g) calibrating the visual display module with the corrected subpixel values *(Col. 16, lines 35-43)*.

Greene et al. however, does not teach converting the chromaticity and luminance value for each measured subpixel value to measured tristimulus value in step (f) nor does Greene et al. teach converting a target chromaticity value and a target luminance value for a given color to target tristimulus values in step (g). Examiner cites Cottone et al. to teach that the conversion between the CIE chromaticity coordinates (x,y) and luminance value Y into the CIE tristimulus value (XYZ) is well known in the art *(Cottone—Col. 5, lines 9-15 and 50-52)*. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to convert the chromaticity and luminance values into tristimulus values as taught by Cottone et al. in the method for calibrating a visual display taught by Greene et al. so as to increase the precision of the color/brightness values. Furthermore it is well known that color can be represented in different formats and any known method of defining color/brightness will perform equally well at helping calibrate a display.

As to **Claim 29**, Greene et al. teaches calibrating the module with the adjusted subpixel values *(Col. 16, lines 35-43)*.

As to **Claims 4 and 16**, Greene et al. teaches wherein the process in step (c) for determining the chromaticity value and luminance value for each subpixel includes the use of an imaging colorimeter *(Greene et al.—Fig. 10, Reference Number 35)*.

As to **Claim 13**, Greene et al. teaches the pixels are pixels of a liquid crystal display (LCD) **(Fig. 8, Reference Number 53)**.

As to **Claims 3 and 12**, Greene et al. does not teach the picture elements to be light-emitting diodes. Examiner cites Cottone et al. to teach pixels in a display unit

comprising of LED's *(Cottone et al.—Col. 1, lines 15-17)*. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to incorporate the light emitting diodes as taught by Cottone et al. in the display device taught by Greene et al. because of their long-term reliability and low power consumption.

5.   Claims 2 and 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Greene et al. and Cottone et al. as applied to claims 1, 3, 4, 10, 12, 13, 16 and 29 above, and further in view of Mendelson et al. (U.S. Patent 6,559,826).

As to **Claim 2 and 11**, Greene et al. as modified by Cottone et al. does not teach (h,k) setting the visual display module image to the color red; (i,l) repeating steps (a) to (f,j); and (l,m) repeating steps (h,k) and (l,l) with the visual display module image set to green, blue, and white. Examiner cites Mendelson et al. to teach setting the visual display module image to the color red, green, blue and white and calibrating the display after each color is set *(Mendelson—Col. 15, lines 24-52)*. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to set the visual display module to each primary color including white and provide calibration after each color is set in the method taught by the modified invention of Greene et al. and Cottone in order to provide accurate calibration for the entire display.

6.   Claims 8, 9, 20, 21 and 22 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Greene et al. and Cottone et al. as applied to claims 1, 3, 4, 10, 12,

13, 16 and 29 above, and further in view of Ott (USPGPUB 2004/0066515).

As to **Claim 22**, Greene et al. teaches an apparatus for analyzing and calibrating

a visual display, comprising: means for capturing an image from a portion of the visual

display module *(Col. 17, lines 12-39 and Fig. 8, Reference Number 53)*; means for

determining a chromaticity and a luminance value for a plurality of subpixels from the

captured image *(Col. 16, lines 10-13)*; Greene et al. also teaches a target value *(Col.

16, lines 6-13)*; and means for adjusting chromaticity and luminance values for each

subpixel to correspond with the target chromaticity and luminance values *(Col. 16, lines

35-57)*.

Greene et al. however, does not teach converting the chromaticity and luminance

value for each of the subpixels to measured tristimulus values nor does Greene et al.

teach converting a target chromaticity value and a target luminance value for a given

color to target tristimulus values. Examiner cites Cottone et al. to teach that the

conversion between the CIE chromaticity coordinates (x,y) and luminance value Y into

the CIE tristimulus value (XYZ) is well known in the art *(Cottone—Col. 5, lines 9-15

and 50-52)*. At the time the invention was made, it would have been obvious to a

person of ordinary skill in the art to convert the chromaticity and luminance values into

tristimulus values as taught by Cottone et al. in the method for calibrating a visual

display taught by Greene et al. so as to increase the precision of the color/brightness

values. Furthermore, it is well known that color can be represented in different formats

and any known method of defining color/brightness will perform equally well at helping calibrate a display.

Finally, Greene et al. as modified by Cottone et al. do not teach the visual display module positioned within a testing station. Greene et al. as modified by Cottone et al. however, do not limit where the method takes place. Examiner cites Ott to teach a measuring device *(Fig. 1, 1)* used to determine pixel-by-pixel measurements. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to incorporate the use of a test station as taught by Ott in the calibration of the visual display taught by Greene et al. as modified by Cottone et al. in order to obtain precise measurements.

As to **Claims 8, 9, 20 and 21**, Greene et al. as modified by Cottone et al. do not teach steps (a)-(g/l) taking place within a test station or darkroom. Greene et al. as modified by Cottone et al. however, do not limit where the method takes place. Examiner cites Ott to teach a measuring device *(Fig. 1, 1)* used to determine pixel-by-pixel measurements. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to incorporate the use of a test station as taught by Ott in the calibration of the visual display taught by Greene et al. as modified by Cottone et al. in order to obtain precise measurements. Furthermore it would have been obvious to a person of ordinary skill in the art to calibrate a module at a test station, darkroom or any environment with ideal conditions that would produce the best test results.

7.   Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Greene et al., Cottone et al. and Ott as applied to claims 8, 9, 20, 21 and 22

above, and in further view of Hsu (USPGPUB 2004/0179208).

As to **Claims 23 and 24**, Greene et al. teaches an optical measuring device *(Fig.*

10, Reference Number 35) for capturing the image from a portion of the visual display;

however, Greene et al. as modified by Cottone et al. and Ott; however, does not teach

the image-capturing device comprising a CCD (or CMOS) digital camera and lens.

Examiner cites Hsu to teach an optical sensor *(Fig. 2, Reference Numbers 3 and 4)*

composed of a CCD (or CMOS) digital camera *(Page 1, ¶ 11)*. At the time the invention

was made, it would have been obvious to a person of ordinary skill in the art to

incorporate the CCD or CMOS digital camera as taught by Hsu in the modified

capturing means taught by Greene et al. and Cottone et al. and Ott in order to

accurately produce high-quality images.

8.   Claims 7, 17, 18, 19 and 31 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Greene et al. and Cottone et al. as applied to claims 1, 3, 4, 10, 12,

13, 16 and 29 above, and further in view of Watanabe et al. (U.S. Patent 4,825,201).

As to **Claims 7 and 19**, Greene et al. as modified by Cottone et al. fails to teach

the process in step (g/i) for sending the correction factors to the visual display module

comprises uploading the corrected subpixel values to firmware and/or software

controlling the visual display module. Examiner cites Watanabe et al. to teach sending

the correction factors to the visual display module comprising uploading the corrected

subpixel values to firmware and/or software controlling the visual display module

(Watanabe et al.—Fig. 6, ROM3 and Col. 6, lines 11-21). At the time the invention

was made, it would have been obvious to a person of ordinary skill in the art to

incorporate uploading the corrected subpixel values to firmware and/or software

controlling the visual display module as taught by Watanabe et al. in the visual display

device taught by Greene et al. and Cottone et al. in order to make the system more

modifiable.

As for **Claim 17**, Greene et al. as modified by Cottone et al. fails to teach storing

the chromaticity and luminance value for each subpixel in a database. Examiner cites

Watanabe to teach storing pixel data in a database *(Fig. 3, E^2 Prom, Col. 4, lines 48-*

49). At the time the invention was made, it would have been obvious to a person of

ordinary skill in the art to incorporate the use of a database as taught by Watanabe et

al. in the visual display device taught by Greene et al. and Cottone et al. so that the

organized data may be easily accessed, managed and updated.

As to **Claim 18**, Greene et al. teaches calculating correction factors for each

subpixel using a computer *(Col. 13, lines 12-18)*. Greene et al. as modified by Cottone

et al., however, fails to teach calculating correction factors for each subpixel using

software. Examiner cites Watanabe to teach calculating correction factors using

software *(Fig. 6, note ROM3)*. At the time the invention was made, it would have been

obvious to a person of ordinary skill in the art to incorporate the use of software to

calculate correction factors as taught by Watanabe et al. in the visual display device

taught by Greene et al. and Cottone et al. so that the system may be more modifiable.

9.   Claim 30 rejected under 35 U.S.C. 103(a) as being unpatentable over Greene

and Cottone as applied to claims 1, 3-6, 10, 11, 13-15, 18, 22, 23 and 30 above and in

further view of Watanabe and McManus et al. (U.S. Patent 5,479,186—hereinafter

"McManus").

As to **Claim 30**, most of the claim limitations found in steps A-F have already

been discussed with respect to claim 1, with the exception of using a flat-fielded imaging

photometer to locate and register multiple subpixels and the correction factors including

a three by three matrix of values that indicates some fractional amount of power to turn

on each registered subpixel for a given color. The Examiner cites Greene to teach a flat-

fielded imaging photometer locating and registering multiple subpixels *(Greene et al.—*

Fig. 10, Reference Number 35). Although Greene teaches the correction factors using

a matrix *(Col. 16, lines 1-28)*, he does not teach that the correction factors include a

three by three matrix of values that indicates some fractional amount of power to turn on

each registered subpixel for a given color. Examiner cites McManus to teach correction

factors including a three by three matrix of values that indicates some fractional amount

of power to turn on each registered subpixel for a given color *(Col. 6, lines 16-32)*. At

the time the invention was made it would have been obvious to a person of ordinary skill

in the art to incorporate the use of a 3-by3 matrix indicating a fractional amount of power

to turn on each registered subpixel as taught by McManus in the method of calibration

taught by Greene, as modified by Cottone, in order to provide consistent calibration for

each registered pixel.

10.   Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Greene et al., Cottone et al. and Ott as applied to claims 8, 9, 20, 21 and 22

above, and further in view of Watanabe et al. (U.S. Patent 4,825,201).

As to **Claim 25**, Greene et al. as modified by Cottone et al. and Ott have failed to

teach software loaded in an interface, the interface being operably coupled to both the

capturing means and the visual display module. Examiner cites Watanabe to teach

software loaded in an interface, the interface being operably coupled to both the

capturing means and the visual display module *(Fig. 6, note ROM3 and Figure 5,*

Correction-value Determining Device and Controller 8) coupled to both the

capturing means (Optical Measuring Device 12) and the Visual Display (Display

Unit 1)). At the time the invention was made, it would have been obvious to a person of

ordinary skill in the art to incorporate the use of software to calculate correction factors

as taught by Watanabe et al. in the visual display device taught by Greene et al.,

Cottone et al. and Ott so that the system may be more modifiable.

Furthermore, at the time the invention was made, it would have been obvious to

a person of ordinary skill in the art to couple the interface to both the capturing means

and visual display module as taught by Watanabe in the visual display device taught by

Greene et al., Cottone et al. and Ott in order to quickly communicate data from one

device to the other.

As to **Claim 26**, Greene et al. as modified by Cottone et al., and Ott have failed

to teach calculating correction factors for each subpixel using software. Examiner cites

Watanabe to teach calculating correction factors using software *(Fig. 6, note ROM3)*.
At the time the invention was made, it would have been obvious to a person of ordinary
skill in the art to incorporate the use of software to calculate correction factors as taught
by Watanabe et al. in the visual display device taught by Greene et al., Cottone et al.
and Ott so that the system may be more modifiable.

Response to Arguments

11.   Applicant's arguments filed March 6, 2007 have been fully considered but they
are not persuasive.

Argument: "Greene further discloses that such adjustments may not be consistent and
pixels in one portion of the display may have luminance values that <u>vary as much as 10-
20% from luminance values in another portion of the display</u>...'<u>an accurate solution is
not needed</u>, because the corrections need to reduce the chromaticity and luminance
nonuniformities only below the detection threshold for the average observer.' At best,
therefore, Greene discloses that the pixels of a display are adjusted so that they are
generally uniform and there are no large differences between adjacent pixels. Nowhere
does Greene disclose or suggest the claimed method that requires calculating
correction factors for each registered subpixel of the display <u>based on a difference
between the measured tristimulus values and the target tristimulus values for a given
color</u>. Rather, Greene"s pixels are only corrected to be consistent with the immediately
adjacent pixels, and are not each corrected based on a single target value for a given
color. (Pg. 13, second paragraph)

Response: Examiner respectfully disagrees. Greene clearly shows calculating

correction <u>factors</u> for each <u>registered subpixel</u> (note that *selected* pixels are turned on

and measured (Col. 17, lines 25-30), the claim does not recite that all pixels are

registered pixels), based on a difference between the measured value (full pixel

characteristics are measured, Col. 17, lines 25-36) and the target value (reference

system selected, Col. 17, lines 25-36). Furthermore, note Col. 16, lines 32-42 wherein it

clearly points out that the claimed limitations "The chromaticity and luminance data for

the primaries of the <u>selected pixels</u> and the reference pixel are stored in a memory sub-

system 42'. The pixel color processor unit 50' operates on the pixel data, one pixel at a

time, <u>computes the corrections</u>...and passes the corrected [values] to the display

controller." Although the luminance values may vary as much as 10-20%, there is no

mention in the claim that the correction factors are accurate. Furthermore, Greene

clearly shows that the selected pixels are corrected in accordance to the reference

value (i.e. target value) (Col. 16, lines 32-42 and Col. 17, lines 25-36). Although there

<u>may be</u> a 10-20% difference between pixels, the correction factors were still <u>based on a</u>

<u>difference</u> between two values as claimed. Therefore, Greene still reads on the claims

1, 11 and 23 because the claim limitation does not recite that the correction factors have

to be accurate. Lastly, Cottone was only brought in to show that it is well known in the

art to convert chromaticity and luminance values to tristimulus values.

Argument: The references teach away from the features of claim 1. Greene

specifically discloses that 'an accurate solution is not needed'. In fact, Greene's

disclosure goes into considerable detail about various methods that can be use to

speed up the calculation process since precision is not necessary....Greene's

disclosure teaches various shortcuts that can be used to speed up the calculations

since the new values don't have to be precise—they just have to be 'below the detection

threshold for the average user'...Rather, Cottone appears to only be used herein to

support the use of tristimulus values. As outlined above, however, Greene teaches

directly away from such additional calculations because they could increase the time

required for processing and provide a much higher level of accuracy than is needed in

Greene's method." (Pg. 14, first paragraph)

Response: Cottone was only used to teach that it is well known in the art to convert

chromaticity and luminance values to tristimulus values. Converting luminance and

chromaticity values to tristimulus values does not require an excessive amount of time.

It is just a conversion, like converting radians to degrees. Furthermore, it is well known

that color can be represented in different formats and any known method of defining

color/brightness will perform equally well at helping calibrate a display. Therefore, the

references used together do not teach away from claim 1.

Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Inquiries

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney Amadiz whose telephone number is (571) 272-7762. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sumati Lefkowitz can be reached on (571) 272-3638. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.
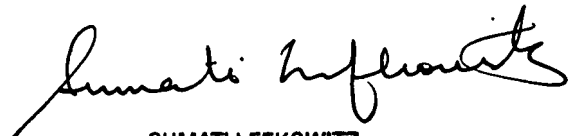
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R.A.

R.A.
7/13/07
Division 2629

SUMATI LEFKOWITZ
SUPERVISORY PATENT EXAMINER